(4) Remarks

Restriction Requirement

The nonelected claims, claims 17-27, have been canceled. Applicant reserves the right to refile these claims in a divisional application.

Claim Objections and Rejections – 35 USC §112

The amendments to claims 11 and 13 address and correct the points identified by the examiner.

Claim Rejections – 35 USC §102

Claims 1, 2, 5, 8 and 9 were rejected under 35 USC §102 as being anticipated by Yamaguchi. This rejection is respectfully traversed.

It will be recalled that the invention enables the use of urea as a replacement for gaseous ammonia to provide active NO_x reduction from a large-scale combustor over a catalyst. The use of urea has been limited in actual operation prior to the present invention because it can easily foul the catalyst. Accordingly, the prior art has, for the most part, either shied away from urea or employed costly equipment to assure that only gaseous reagents entered the effluent upstream of the catalyst. The invention provides an extremely simple, yet effective, departure from current practice.

The claims are now limited to NO_x reduction in large-scale, stationary combustors utilizing gasification products of urea NO_x-reducing agent at high temperature in a flowing side stream of gas having a small volume as compared to the volume of effluent treated.

The process of Yamaguchi is designed specifically to address the problems known to exist for steam generators and adds complexity not necessary for the present invention. Yamaguchi is deficient in showing either enough of the invention to defeat novelty or establish obviousness. The reference does not directly address the problems of utilizing urea. Yamaguchi mentions urea only as an alternative to ammonia and doesn't change the processing to accommodate it. There are no teachings which would make the use of urea effective in such a process. Yamaguchi employs steam to vaporize ammonia in an evaporation tank. It does not use a moving side stream of gases and does not specifically teach the gasification of urea. The vaporization tank is large and, in the case of urea, would be required to be even larger than shown for ammonia. The conditions for urea vaporization are not mentioned in Yamaguchi, but are specifically set out in the claims presented herewith.

Yamaguchi has as its main purpose the mixing of steam and ammonia. The present invention, on the other hand, is concerned with the technology necessary for replacing ammonia with urea. The prior art has not taught a process as simple and effective as that now claimed. Yamaguchi is silent on the conditions necessary to achieve the effects desired.

The line 16 of Yamaguchi does not contain either combustion gases or outside air as called for by the claims as now amended. Present claims 1, 2, 8 and 9 (claim 5 has been canceled) distinguish from Yamaguchi by calling for a *flowing side stream of gases comprised of outside air and/or combustion gases and comprising less than 3% of the volume of the total combustion gases*. The steam in line 16 of Yamaguchi is passed to a vaporization vessel wherein it is contacted with the aqueous ammonia for vaporization. The urea is not introduced into the stream 16, but is passed to a vaporization chamber. The steam of Yamaguchi is super heated steam and preferably is high enthalpy to assure vaporization of the aqueous ammonia. It mentions nothing of conditions necessary for urea or the use of a heated stream of outside air alone or with combustion gases.

Yamaguchi utilizes only steam, and does not carry out the vaporization in a flowing stream, but in a separate reactor vessel.

Accordingly, the Yamaguchi reference is missing any teaching of essential elements of applicants' invention and cannot, therefore, be said to anticipate the invention of claims 1, 2, 8 and 9.

Claim Rejections – 35 USC §103 - Yamaguchi

Claims 3, 4, 8, 9 and 13 were rejected under 35 USC §103(a) as defining an invention which is unpatentable over Yamaguchi. This rejection is respectfully traversed.

The distinctions of the base claims detailed above apply here with equal weight. Simply, there is no motivation supplied by the reference for the skilled worker to modify the teachings of Yamaguchi to provide for introducing a urea NO_x-reducing agent at high temperature in a flowing side stream of gas comprised of effluent gas and/or outside air having a small volume as compared to the volume of effluent treated.

Applicants note that the super heated steam of Yamaguchi is the sole gas and that no side stream or side stream gas is actually present to be heated by the steam. Applicants invention has the advantage that it can be employed where there is no steam available or readily accessible. The fact that applicants' invention can employ steam when desired for heat and/or adding moisture, however, is unobvious because it is being employed to heat a side stream of combustion gases and/or outside air where that is desirable. Thus, the present invention adds flexibility and improved functionality than is provided by disclosure or otherwise possible with that of Yamaguchi.

In addition, the moving side stream of effluent and/or outside air set out in the present claims and absent from Yamaguchi, assists in mixing and then dispersing the gasified urea.

The process of the invention, thus, provides advantages of functionality and in terms of process flexibility much improved over Yamaguchi. Because there is no reason for so modifying the system of Yamaguchi, much less motivation for doing so, the subject claims are not obvious from Yamaguchi.

Claim Rejections – 35 USC §103 – Yamaguchi with Peter-Hoblyn

Claims 6, 7 and 12 were rejected under 35 USC §103(a) as defining an invention which is unpatentable over Yamaguchi, taken further in view of Peter-Hoblyn. This rejection is respectfully traversed for the reasons above and because the Peter-Hoblyn reference does not cure the deficiencies of the base reference.

Peter-Hoblyn does not, as with Yamaguchi, provide a moving side stream of effluent and/or outside air to assist in mixing and then dispersing the gasified urea. Again, as pointed out above, the provision of a moving side stream of effluent and/or outside air set out in the present claims and absent from both Yamaguchi and Peter-Hoblyn, assists in mixing and then dispersing the gasified urea.

Claims 14, 15 and 16 were also rejected under 35 USC §103(a) as defining an invention which is unpatentable over Yamaguchi, taken further in view of Peter-Hoblyn. This rejection is respectfully traversed for the reasons above and because the Peter-Hoblyn reference does not cure the deficiencies of the base reference.

In each of these rejections, the art has failed to teach a reason for or provide motivation to modify the Yamaguchi and/or Peter-Hoblyn references to meet the terms of the claims which define a process having added functionality and flexibility of operation.

Claim Rejections – 35 USC §103 – Yamaguchi with Tarabulski

Claim 9 has been rejected under 35 USC §103(a) as defining an invention which is unpatentable over Yamaguchi, taken further in view of Tarabulski. This rejection is

respectfully traversed for the reasons above and because the Tarabulski reference does not cure the deficiencies of the base reference.

Claim Rejections – 35 USC §103 – Yamaguchi with Cohen

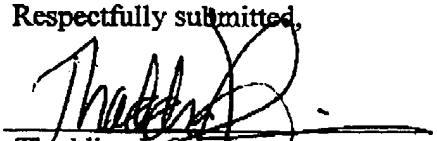
Claim 10 has been rejected under 35 USC §103(a) as defining an invention which is unpatentable over Yamaguchi, taken further in view of Cohen. This rejection is respectfully traversed for the reasons above and because the Cohen reference does not cure the deficiencies of the base reference.

Applicant notes that because the references do not address the problems faced by the invention and do not present technical solutions for those problems, the teachings of these references cannot be said to establish that the dependent claims describe known features. Indeed, the mere correspondence of the prior art to some but not all of the claimed features leaves the present invention as novel and inventive.

The absence of closer teachings to the claimed invention highlights the fact that the art has not effectively dealt with the problems of utilizing urea as an ammonia substitute for selective catalytic NO_x reduction systems.

Applicant has made a significant advance in the art of selective catalytic NO_x reduction by enabling the use of urea in a very simple and effective manner. The invention is described in terms that clearly distinguish from the prior art of record. Accordingly, early and favorable action is earnestly solicited.

Respectfully submitted,



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